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Full Length Research Paper

Credit extension in South Africa: A business cycle perspective for the period 1985 to 2009

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This paper investigates and quantifies the relationship between the macroeconomic business cycle and bank-granted credit in South Africa for the period 1985 to 2009. The main question that this research seeks to answer is what role do banks play in amplifying the business cycle and what is the impact of this on the macroeconomy? The outcomes of the econometric model support the hypothesis that a positive relationship exists between bank-extended credit and the business cycle. The vector autoregression technique was used to prove the relationship between credit and the underlying cycle. The analysis shows that a two-way relationship exists between credit and the coincident indicator, credit and insolvencies and credit and prime. Results from the vector error correction model show a significant short-run relationship of equilibrium in the cointegrating equation between credit and the coincident indicator. This corroborates the underlying theory that credit is a unifying variable that rapidly responds to shocks emanating from the dynamic interaction of cointegrating variables in the economy.

Key words: Business cycle, credit, procyclicality, vector autoregression (VAR), cointegration, structural vector autoregression (SVAR).

INTRODUCTION

The speed, severity and geographic reach of the credit crisis of 2008 have renewed the prominence of credit in the rhythm of the business cycle (Rose and Spiegel, 2009: 1). This has revitalised investigations into the possibility that changes in the supply of credit can amplify the macroeconomic cycle and potentially increase systemic risk. Studies show a positive relationship between credit granting practices and the macroeconomy. Hofmann (2005: 1) states that banks grant more loans in upswings than during downswings of the cycle. Empirical studies take this further by substantiating the claim that banks amplify the business cycle by increasing access to credit during the upturn and tightening credit during the downturn and at the trough (Akinboade and Makina, 2009a: 1; Armistead, 2009: 1; Bordo and Haubrich, 2009: 21; Borio et al., 2001: 1; Masschelein, 2007: 1; Columba et al., 2009: 1; White, 2006: 4). While the notion that banks exacerbate the business cycle dates back to Fisher (1933), various references through the history of global business cycles point to the role that credit extension plays in exacerbating the credit cycle. Peek and Rosengren (1995: 47) maintain that the tightening of access to credit by banks contributed to the 1990 to 1991 New England recession. Bernanke and Lown (1991:206) explain bank credit rationing as an integral part of a credit crunch. Bordo and Haubrich (2009: 13), Columba et al. (2009: 1), Borio et al. (2001: 1, and Masschelein (2007: 1) associate the rapid decrease of credit in the 2007 credit crisis with bank lending. Thus, there is growing evidence linking credit procyclicality with the macroeconomy.

The consequences of an excessive credit granting during the growth cycle go beyond bad debt. The dislocation in the recent collapse of financial markets has caused macroeconomic and humanitarian complexities and traumas that will have an abiding effect on credit consumers. The following statistics highlight the scourge

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of over-indebtedness that manifested itself during the recession that occurred in 2009 in South Africa, after a decade-long growth cycle between 1999 and 2009. Real GDP growth decreased for two consecutive quarters in 2009, thereby marking a technical recession for South Africa. For the first time ever, credit extension growth, measured as loans and advances, moved into negative territory for three consecutive quarters starting in Q 2 of 2009 (SARB, 2010: 37). More than 1.04 million South African citizens became unemployed between Q 4 of 2008 and 2010 Q 1 from the peak to the trough through the cycle (Statistics South Africa, 2010: 7). Half a million South Africans were classified as discouraged workers in 2009 (Statistics South Africa, 2009: 4). Finally, the Rand Merchant Bank and the Bureau for Economic Research estimated that the business confidence index declined from a level of 85 in the third quarter of 2006 to a low of 23 in 2009 Q3 (Le Roux, 2009: 1).

These consequences beg the question on what the contributing factors to the volatile variations are. It is important to understand the cause and effect of credit granted by banks because the pattern of lending may impact the business cycle and therefore the economic growth of the country (Akinboade and Makina, 2009a: 3). It is also necessary to determine the linkages between credit and the business cycle in order to understand how extreme fluctuations in the cycle can be avoided. This research analyses how those factors affecting the broader amplitude and fluctuations can be better managed to avoid the negative macroeconomic and humanitarian costs. The main question that this research seeks to answer is what role do banks play in amplifying the business cycle and what is the impact of this on the macroeconomy?

Further, credit is discussed as an integral component of the business cycle, followed by a historical overview of business cycles. The econometric model is described, with a brief literature review of similar studies undertaken in this field. The paper concludes with the econometric results and tentative recommendations for future studies.

CREDIT AS AN INTEGRAL LINK TO THE BUSINESS CYCLE

From the early 1900's, credit has been a powerful propagation mechanism which has systematically affected the timing, duration and amplitude of cycles in money, credit and output in the macroeconomy (Akinboade and Makina, 2009a: 1; Armistead, 2009: 1; Bordo and Haubrich, 2009: 2; Columba et al., 2009: 1; Masschelein, 2007: 1; Bordo, 2006: 2; White, 2006: 4; Borio et al., 2001: 1; Asea and Blomberg, 1997: 2). Credit involves the finance that banks and microlenders grant to customers and the decision to grant credit is based on a systematic evaluation of the credit risks associated with the borrower (Crouhy et al., 2001: 60). According to Borio et al. (2001:1), credit sustains and directs the development and momentum of the financial and economic cycle. Economists have used the term 'discredit' to describe the trough of an economic cycle dating back to the early 19th century (Bordo and Haubrich, 2009: 2). The expression 'credit crunch' is typically associated with an increase in the scarcity and cost of credit and is defined by Owens and Schreft (1993:16) as 'non-price credit rationing' (Bordo and Haubrich, 2009: 10; Bernanke and Lown, 1991: 205).

Credit is the product of moderating factors, whereby risk appetite and behavioural elements determine bank lending activity across phases of the business cycle (Smullen and Hand, 2005: 98). A bank's appetite for risk is calculated by trading-off risk with return (Van Zyl et al., 2003: 33). Behavioural factors that affect the decision to grant or accept credit are based on emotion and a spontaneous urge to action (Akerlof and Shiller, 2009: 3; Keynes, 1921: 51). Accordingly, in 1921, Keynes condemned the practice of pure mathematical probability and introduced the concept of judgment and behavioural dynamics into the study of economics. Nobel Laureates Kahneman and Tversky introduced the Prospect Theory, which showed evidence of asymmetry in the manner in which people trade off gains from losses (Tversky, 1990: 25). They propose that losses, more than gains, provoke irrational decisions (Bernstein, 1998: 270).

In addition to the factors noted earlier, supply and demand-side factors are at play through the cycle (Asea and Blomberg, 1997: 2; Kiyotaki, 1998: 19; Masschelein, 2007: 2). Supply-side factors are typically endogenous and include capital, asset values, leverage and accounting standards. Capital is a scarce and costly resource and follows the cycle procyclically (Masschelein, 2007: 3). Economists at the BIS are currently working to devise a counter-cyclical algorithm that increases capital during growth cycles and decreases it during contractions. The idea behind this is to fuel the economy during a slump and avoid overheating during growth trajectories (Masschelein, 2007: 3). Moreover, asset values tend to rise during an upswing and decline during a downswing or contraction, thereby reducing collateral values and accelerating the amplitude of the cycle (Bernanke and Gertler, 1989: 19). Similarly, banks attempt to maintain a consistent leverage ratio and thereby, tend to increase leverage build up during the upswing and decrease it during the downswing (Adrian and Shin, 2009: 5). Furthermore, Scarlata et al. (2009: 107) state that fair value accounting magnifies volatility because it instantly recognises profits and losses which may inaccurately reflect the underlying risk or value. Demand-side propagators of credit tend to affect the balance of good relative to bad credit risk customers in a bank's portfolio of assets.

Lastly, exogenous factors are at play, whereby the first and emerging worlds as well as the timing differences mutually influence the effect of credit extension on the

business cycle (Bordo, 2006: 6). According to Kaminsky et al. (2004: 31), the behaviour of exogenous factors in business cycle theory tends to follow the type of economies, with emerging economies presenting greater vulnerability to cycle swings in emerging markets. Exogenous factors tend to have a more procyclical effect on the economy (Kaminsky et al., 2004: 31).

HISTORICAL CONTEXT OF BUSINESS CYCLES

Various structural disruptions have evolved over the eras, all of which have a role to play in the cause, nature and amplitude of cyclical variation (Bordo, 2006: 6). The analysis and comparison of macroeconomic fault-lines of the past provides a useful basis to compare cyclical patterns across countries and monetary regimes (Schularick and Taylor, 2009: 1; Bergman et al., 1998: 4). Various signal events across the history of the world are connected to the start and end points of the business cycle (Stock and Watson, 1998: 1). Events that spring to mind range from the first and second world wars to the Great Depression of the 1930s and the inflation volatility caused by the OPEC price spikes of the ‘1970s (Stock and Watson, 1998: 1). The uninterrupted period of growth over the past decade and the globally contagious credit crisis of 2008 are fresh in the minds of contemporary economists. These events have created a platform for economists to investigate the role of financial inter-mediation and its effect on the business cycle (Schularick and Taylor, 2009: 1).

Economic history tells a tale of two cities, wherein two opposing schools of thought exist on the role of money and credit in the macroeconomy. The Neo-Keynesians support the idea that macroeconomic fluctuation in the cycle is independent of the functioning of the financial system (Schularick and Taylor, 2009: 1). Moreover, various economists have argued that the financial markets and specifically credit and money play a central role in the amplitude, duration and nature of the business cycle. Economists that support the central, unifying role of money in the business cycle date back to the beginning of the 20th century with Hawtrey, followed by Fisher in 1933, Minsky in 1978, Bernanke in 1983, Gertler in 1988 and Schularick and Taylor in 2009 (Schularick and Taylor, 2009: 1; Cloete, 1990: 62).

Monetary cycle theory is built on Hawtrey’s model that bank granted credit is the cause of the fluctuation of the business cycle (Cloete, 1990: 64). The leading idea of Hawtrey’s theory is that banks exacerbate the cycle as they grant too much credit during the upturn and excessively contract access to credit during the downturn (Cloete, 1990: 64). The availability and cost of credit is determined by the interplay of credit supply and demand and the moderating factor is the interest rate. According to Botha (2004: 10), customers deposit excess money with banks in the form of credit balances during a period of expansion. As a result of the surplus liquidity, banks increase lending. As customers have increasing access to cheaper credit, capital investment and consumption increases, thus fuelling the demand for credit (Botha, 2004: 10). This culminates in the peak of a cycle, where-by bank funds begin to become scarce and the demand by banks for deposits increases. The increased demand for deposits drives the interest rate higher which, in turn, places pressure on banks to increase the cost and availa-bility of credit. The rising interest rates and contracting credit granted by banks result in a decrease in consumption and investment, culminating in the reduction of aggregate economic activity (Botha, 2004: 10; Cloete, 1990: 64).

Friedman and Schwartz’s (1963) canonical ‘money view’ continued to build on this theory; basing their thinking on a strong historical statistical relationship that money supply influences output in the short run. More recently, the leading idea of Friedman and Schwartz’s ‘money view’ has evolved into the ‘credit view’. Schularick and Taylor (2009: 2) expand on the work of Freixas and Rochet in 1997 by creating three prominent periods of macroeconomic theory regarding the influence of credit and money on the business cycle.

The first era, known as the ‘money view’, covers the classical gold standard period from the end of the nineteenth century to the beginning of the twentieth century (Schularick and Taylor, 2009: 2). This period is aligned with Friedman and Schwartz’s (1963: 1) influential work suggesting that output in the short-run is influenced by the level of money supply. While the central bank plays a vital role in indirectly controlling the banks, Friedman and Schwartz (1963: 119) do not believe that bank granted credit played a role in the fluctuation of the business cycle.

The interwar and Bretton Woods periods were aligned by what Schularick and Taylor (2009: 2) called the ‘irrelevance view’. This era was associated with the contributions by Modigliani and Miller in 1958 which downplayed the importance of financial structures in the macroeconomy (Schularick and Taylor, 2009: 2). During this period, emphasis fell on the real economy and accordingly, the role of finance was subordinated. Although this view remains substantially supported, the recent credit crisis has begun to open the door to new schools of thought which reinvigorate the focus on money and credit.

Schularick and Taylor’s (2009: 2) ‘credit view’ dominated the period after 1980. Seminal contributors to this school of thought date back to Fisher (1933: 337) in the early half of the twentieth century and include Bernanke (1983: 258), Gertler (1988: 559), and Shularick and Taylor (2009: 2). The leading idea of this ‘credit view’ is that bank-granted credit plays a central role in the fluctuation of the macroeconomic cycle (Schularick and Taylor, 2009: 1). While credit is proposed as a central phenomenon in business cycle theory, it is important to

acknowledge the country-specific factors that have developed over the economic and historical context of a country that have to be considered.

Schumann (1938: 55) maintains that the discovery of mineral resources on the entrenched barter system formed a catalyst that rapidly moved South Africa to modern credit money. Advances in money and banking, however, started long before the discovery of gold. According to Schumann (1938: 72), the medium of money was used much earlier as a 'circulating mechanism', the first evidence of this being as early as 1834.

Schumann (1938:85) highlights that unsound banking practices greatly contributed to the diamond crisis and consequent depression of 1881. In his commentary of bank's indiscretions, Arndt (1937: 282) criticises banks for procyclicality by over-lending during the boom period and for rapid curtailment of credit after 1881. Arndt (1937: 282) maintains that "the bank staff at the time was relatively youthful, and few had had experience of commercial crises or application of banking principles outside of mere routine". Commentary by governments and regulators in more recent crises are reminiscent of Arndt's prescient observations of over a century ago.

Important signal events in modern South African history that have left an imprint on South Africa's macroeconomy date back to the influence of the Anglo Boer War from 1899 to 1901, South Africa's independence in 1910, the discovery of gold and the world wars. More recently, the macroeconomic effects during the period marking the downfall of the Apartheid government system between 1960 and 1994, culminated in the introduction of the new democracy in 1994. This has had a profound effect on the shape and nature of the South African macro-economy and the behaviour of the business cycle. The openness of the economy after the 1994 elections and the high growth rates together with various policies directed at previously disadvantaged South Africans, created an environment for a burgeoning middle class population. This caused a structural shift in the demand side of the economy. Moreover, this created the platform for globally aligned growth and an uninterrupted decade-long credit boom. This exponential growth in credit finally culminated in the 2007/2008 credit crisis.

ECONOMETRIC MODEL TO MEASURE INTERDEPENDENCIES IN THE BUSINESS CYCLE

Various techniques have been used to measure business cycle fluctuation, ranging from simple univariate time series analysis to leading indicators and the Harding and Pagan algorithm, structural VAR, dynamic factor analysis and the Markov switching model. Vector autoregression (VAR) and structural vector autoregression (SVAR) were used in this study, because this technique has been used widely to measure interdependencies between multiple time series and business cycle fluctuations (Sims, 2002: 1). Emerging interest is shown by the many studies that have used SVAR to understand various aspects of the business cycle. It uses shocks to shed light on the variables that display a strong relationship with the underlying amplitude of the cycle (Sims, 2002: 3).

Stock and Watson (2003: 11) use VAR to understand the changes in international business cycle dynamics. Akinboade and Makina (2009a: 5) apply SVAR to investigate the effects that coincident indicators have on credit in South Africa. SVAR's ability to capture interactions between variables is a key factor in the selection of this technique. Lown and Morgan (2004: 1) in their paper on commercial bank lending standards and output, use VAR to demonstrate how credit standards explain the variation in the business cycle. Credit standards are regarded as an endogenous variable (Lown and Morgan, 2004: 3). They use a VAR model that controls for macroeconomic and monetary conditions to demonstrate that shocks to credit standards contribute to most of the variance in business lending. An investigation of business cycles during the period 1834 and 1987 by Schwert (1989: 31) uses VAR to demonstrate how stock volatility increases during a financial collapse. Bordo et al. (2008: 16) use SVAR to examine the relationship between inflation, monetary policy and the US stock market conditions after World War II.

Model specification

The hypothesis tested in the VAR model is that credit has a relationship with the coincident indicator, insolvencies, debt to disposable income, cost of funds, prime, money supply and business and consumer confidence indices. The quarterly data series is sourced from the SARB (2010) and Reuters (2010) websites and covers the period 1985: 01 to 2009: 04:

Credit = f {coincident indicator, insolvencies, debt to disposable income, cost of funds, prime, and confidence indices}.

In line with financial and economic theory, Bordo and Haubrich (2009: 2) note that Sprague, in 1910, debated the extent to which credit expands and contracts systematically through phases of the business cycle. The expansion and contraction of credit have macroeconomic consequences that range from contracting GDP to rising unemployment, a decrease in business and consumer confidence, an increase in the number of insolvencies, a rise in the levels of debt and an increase in credit costs (Bordo and Haubrich, 2009: 13; Columba et al., 2009: 3; Bordo, 2006: 2; Rajan, 2005: 31; Pesaran et al., 2005: 3; Basu and Taylor, 1999: 1; Kiyotaki, 1998: 1; Bernanke, 1983: 257). Credit is therefore seen as a unifying variable in this analysis.

The coincident indicator is used as a measure of aggregate economic activity, measuring the phases of the business cycle (Akinboade and Makina, 2009a: 4). The SARB quarterly bulletin publishes the coincident indicator as a measure of the turning point in the cycle, which gives an indication of the fluctuation of the long-term trend around the cycle average (Venter and Pretorius WS, 2009: 61).

This model uses insolvencies to reflect bad debt levels. The hypothesis of this model supports the notion that banks react to a downturn by making credit criteria more conservative and reducing their risk appetite, and therefore, reducing the amount of credit that they extend. According to Rajan (1994: 2), bank executives make short-term credit decisions based on demand-side circumstances which tend to intensify the business cycle (Akinboade and Makina, 2009b: 478).

Business and consumer confidence indices reflect the qualitative perceptions of the prevailing psychology of the market. These confidence indices are therefore used to represent the behavioural economic factors that might be affecting credit extension and the business cycle at large. The Bureau for Economic Research (BER) consumer confidence index and South African Chamber of Business (SACOB) business confidence index are used to represent confidence in the model.

Bank lending is funded by a mix of deposits made by depositors and wholesale funding (Otto, 2007: 5). During a credit crunch, when funds become more expensive, banks react by shrinking the amount of credit that they extend or by increasing the cost of credit. A decline in credit extension reduces consumption and creates a feedback loop that ultimately affects production and causes GDP to contract the macroeconomy (Akinboade and Makina, 2009a: 1; Armistead, 2009: 1; Bordo and Haubrich, 2009: 2; Columba et al., 2009: 1; Masschelein, 2007: 1; Bordo, 2006: 2; White, 2006: 4; Borio et al., 2001: 1; Asea and Blomberg, 1997: 2).

In this research, cost of funds is measured as the difference between the 'Negotiable Bearer Certificate of Deposits' (NCD) and SWAP curves. By calculating the spread between NCD and SWAP curves, a proxy is created for liquidity premiums which reflect the underlying cost of funds. The SWAP curve data is not available prior to 1990. Government bonds of 0 to 3 years which represents the yield on loan stock traded on the bond exchange, was used as a SWAP curve proxy for the period 1985 to 1990.

Debt to disposable income is used as the demand-side measure in this model. The risk-averse customers that display a low propensity to default typically react during times of economic turbulence by de-leveraging their balance sheets and moving to cash (Crouhy et al., 2001: 232). This has the effect of exacerbating the cycles as the proportion of higher-risk customers applying for credit increases. Furthermore, distressed-debt-borrowing propensity increases, which further aggravates the deteriorating credit profile of credit seekers.In addition, the downswing deteriorates and banks increase credit costs. This leads to a phenomenon of negative selection of risky customers that are distressed and willing to incur premium-priced credit.

Therefore, debt to disposable income as published by the SARB is used to measure the demand-side indebtedness of the consumer. This is seen as an integral contributor in the extension of credit through the cycle. The prime interest rate is the benchmark rate that banks quote when they extend credit (Chetty et al., 2008: 260; Otto, 2007: 16). According to Chetty et al. (2008: 260), the SARB will increase the Repo rate if it anticipates that inflation is on the rise. This will cause an increase in the cost and a reduction in the availability of credit. A positive relationship between credit and the interest rate is expected.

ECONOMETRIC RESULTS

This analysis is based on the VAR methodology to test the relationship between credit and the business cycle. The measurement begins with unit root tests, using the Dickey-Fuller and Phillips-Perron tests to establish stationarity. Johansen's test is applied to the variables to test for cointegration. Thereafter, the Pairwise Granger causality and Block Wald exogeneity tests are used to determine whether endogenous variables can be treated as exogenous. The optimal lag length structure is determined by the Schwarz information criteria (SIC) and the Hannan-Quinn (HQ) information criterion. Following on from this, a vector error correction (VEC) model is applied to test for short-run equilibrium responses. Finally, innovation accounting including impulse responses and variance decomposition techniques are used to uncover the short-run dynamics of the VEC model. The Dickey-Fuller and Phillips-Perron tests were performed to identify the presence of unit roots in the variables. The following variables rejected the null hypothesis and were therefore I(0) or stationary on the level. These variables are the coincident indicator; consumer confidence index; credit; cost of funds; prime interest rate; and insolvencies. The two remaining variables were I(1), namely debt to disposable income and the business confidence index.

The Johansen cointegration test indicates that cointegration was present. The results support the hypothesis that several long-run equilibrium relationships exist between the variables. Table 1 shows that, according to the Granger causality tests, a two-way relationship exists between credit and the coincident indicator, with T-statistics of 5.93788 and 23.3265 respectively. This relationship is significant and supports the hypothesis that a relationship between credit and the coincident indicator exists. That is, a dynamic and mutually reinforcing relationship exists wherein neither credit nor the

Table 1. Pairwise Granger causality test results.

Null hypothesis	Observation	F-Statistic	Prob.
Credit does not Granger cause coincident indicator	99	5.93788	0.0167*
Coincident indicator does not Granger cause credit	99	23.3265	5.E-06*

* Reject null hypothesis (Source: Eviews estimates).

coincident indicator are exogenous. This is congruent with the long-run cointegrating relationship displayed by the Johansen test results. These results substantiate the findings by Akinboade and Makina (2009a: 4), Armistead (2009: 1), Bordo and Haubrich (2009: 21) and White (2006: 4) that demonstrate a relationship between credit extension and the business cycle. Furthermore, this outcome corroborates the findings of Lown and Morgan (2004: 1) that demonstrate how credit standards explain the variation of the business cycle.

Moreover, the Granger causality tests support a two way relationship between credit and insolvencies. Credit also causes or impacts cost of funds and prime. This outcome supports the economic theory that a credit boom drives up demand for funding which increases asset prices and cost of funds. Moreover, an increase in credit will endogenously increase insolvencies as consumers over extend themselves due to an increase in the access to credit. An increase in credit will culminate in growth in the economy and a concomitant increase in inflation, which leads to an increase in the prime rate.

The results from the vector error correction model (VECM) indicate how long it will take for a variable to return to equilibrium in the short-run when confronted with a shock. The VEC results indicate a significant short-run equilibrium relationship in the cointegrating equation between credit and the variables in the model. This supports the theory of procyclicality that credit is a unifying variable which will rapidly respond to shocks emanating from the dynamic interaction between variables macroeconomy (Akinboade and Makina, 2009a: 1; Armistead, 2009: 1; Bordo and Haubrich, 2009: 2; Columba et al., 2009: 1; Masschelein, 2007: 1; Bordo, 2006: 2; White, 2006: 4; Borio et al., 2001: 1; Asea and Blomberg, 1997: 2). The significant credit and coincident indicator results corroborate the test results in the cointegration and Pairwise Granger causality tests.

In the innovation accounting analysis, structural decomposition was applied and tested for robustness by first restricting the top diagonal, followed by a restriction of the bottom diagonal. The results from the restriction of the lower diagonal were used (Power and Vedenov, 2009: 8).

The impulse response functions outline the effects of a shock in the error terms to one endogenous variable on the other variables in the VAR (Gujarati and Porter, 2009: 789). According to Gujarati and Porter (2009: 789), this technique traces the effect of the shock on current and future values of the endogenous variables.

The results from the impulse response tests confirm the VECM results. Figure 1 show that the credit response to a coincident indicator shock returns to equilibrium after 5 periods and then moves away from equilibrium. This supports the Pairwise Granger causality test outcome, which showed a two-way relationship between credit and the coincident indicator. These outcomes are supported by economic theory and empirical studies contending that a positive relationship exists between credit and the fluctuation of the business cycle macroeconomy (Akinboade and Makina, 2009a: 1; Armistead, 2009: 1; Bordo and Haubrich, 2009: 2; Masschelein, 2007: 1; Bordo, 2006: 2; Borio et al., 2001: 1; Asea and Blomberg, 1997: 2). The immediate response of credit to the coincident indicator indicates that banks react immediately to a change in the economic cycle. The lagged response of the coincident indicator to credit supports the view that credit extension builds up over a period before the full impact is seen in the economy. Both of these outcomes substantiate the claim by economists such as Bordo and Haubrich (2009: 1); Borio et al. (2001: 1) and White (2006: 4) that banks amplify the business cycle by increasing access to credit during the upturn and tightening credit during the downturn. Figures 1 and 2 show that the impulse responses corroborate evidence from empirical studies by Akinboade and Makina (2009a: 1), Bordo and Haubrich (2009: 1) and Lown and Morgan (2004: 1) revealing a positive relationship between credit and the macroeconomy.

Credit moves towards equilibrium 3 to 4 periods after a shock in business and consumer confidence as well as cost of funds. Credit takes 8 to 10 periods before reaching equilibrium when faced with shocks in debt, insolvencies and prime. Credit begins by moving away from equilibrium after a debt to disposable income shock. The outcome of this can be justified by economic theory. Credit extended by banks is based on affordability assessments with levels of indebtedness being integral to the evaluation. Consequently, changes to consumers' debt to disposable income levels will be closely correlated to credit extended (Crouhy et al., 2001: 68). Should a shock occur, credit extended by banks will be reduced immediately, thereby causing credit to move away from equilibrium.

Figures 1 and 2 shows that the coincident indicator react to most variables, returning to equilibrium eventually. The coincident indicator responds almost immediately to a shock in business confidence. It takes 4 periods for the coincident indicator to reach equilibrium after a cost of funds shock and thereafter, the coincident

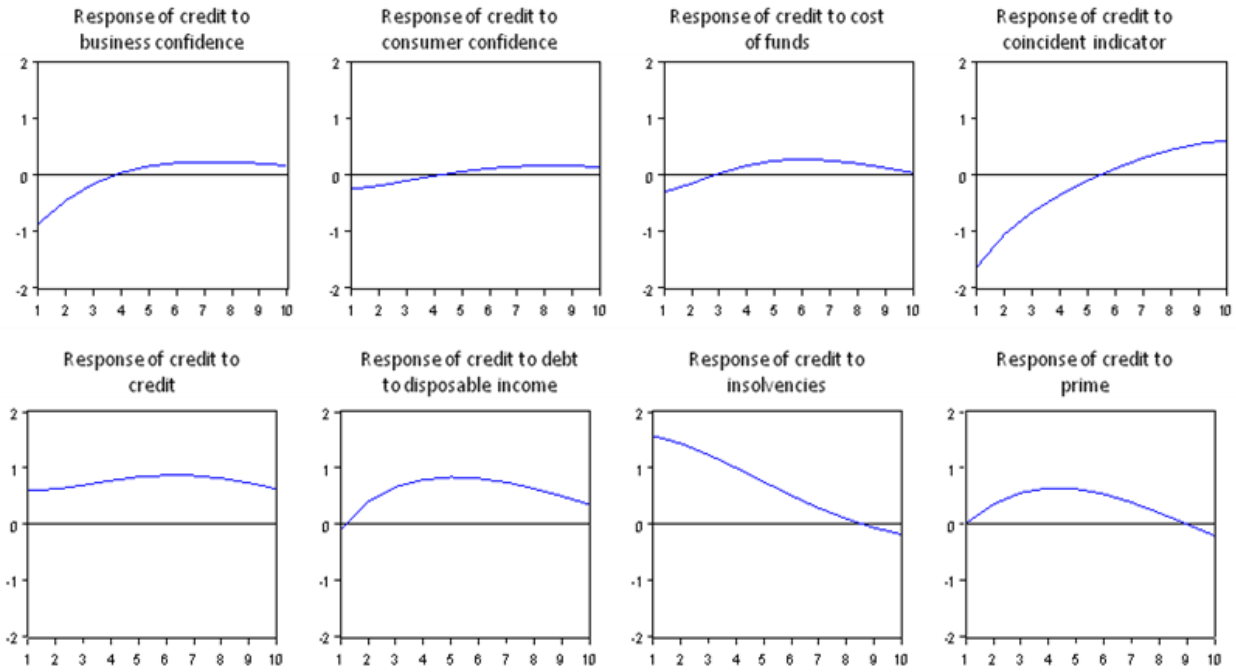

Figure 1. Impulse response outcomes of credit (source: EViews estimates).

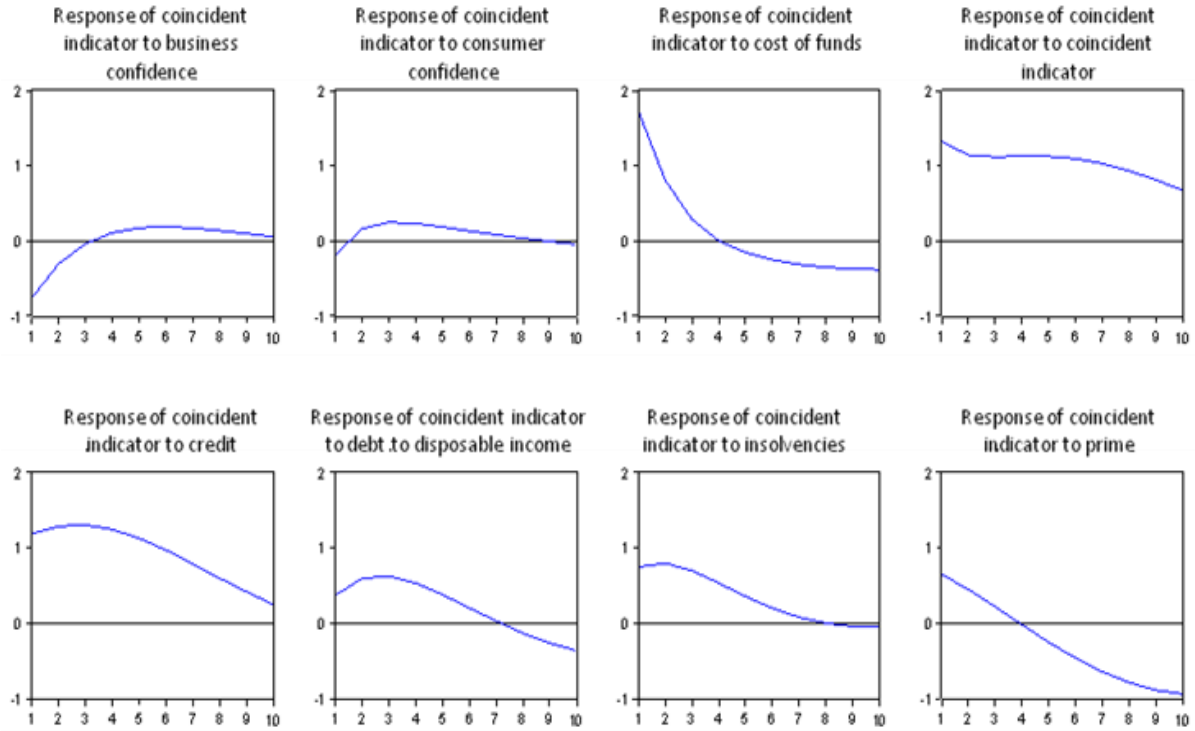

Figure 2. Impulse response of coincident indicator (source: EViews estimates).

indicator reacts negatively. This might be because of secondary effects of the funding shocks being felt in the economy. Moreover, this outcome corresponds to the behavioural economic theory that Berger and Udell (2003: 3) refer to as the 'institutional memory hypotheses. This hypothesis indicates that an institution's credit

Table 2. Variance decompositions results.

Coincident indicator									
Period	**S.E.**	**Shock1: Business confidence**	**Shock2: Consumer confidence**	**Shock3: Cost of funds**	**Shock4: Coincident indicator**	**Shock5: Credit**	**Shock6: Debt**	**Shock7: Insolvencies**	**Shock8: Prime**
1	2.923315	7.288456	0.466944	37.83049	22.36003	18.01694	1.717298	7.051286	5.268564
2	3.893119	5.218898	0.488047	28.32135	23.97837	24.06416	3.822168	9.313249	4.793761
3	4.553877	3.981984	0.725754	22.04476	25.68977	28.44849	5.213046	9.970556	3.925637
4	5.075907	3.358855	0.861608	18.28704	27.60882	31.25493	5.714114	9.655381	3.259240
5	5.527825	3.057797	0.897075	16.06191	29.56729	32.73179	5.598550	8.959635	3.125963
6	5.943721	2.889529	0.875615	14.72126	31.30173	33.12061	5.200562	8.221901	3.668791
7	6.340598	2.760142	0.829057	13.89661	32.58483	32.67338	4.786385	7.583937	4.885660
8	6.725527	2.635103	0.777193	13.37995	33.29251	31.66370	4.524225	7.073856	6.653462
9	7.099479	2.510035	0.732304	13.04884	33.42244	30.36417	4.486530	6.669920	8.765766
10	7.459796	2.391828	0.701478	12.82739	33.07383	29.01004	4.668409	6.341198	10.98583
Credit									
Period	**S.E.**	**Shock1: Business confidence**	**Shock2: Consumer confidence**	**Shock3: Cost of funds**	**Shock4: Coincident indicator**	**Shock5: Credit**	**Shock6: Debt**	**Shock7: Insolvencies**	**Shock8: Prime**
1	7.153997	11.74735	0.961145	1.406174	41.29972	5.805740	0.143729	38.63509	0.001049
2	8.270165	9.098225	0.924751	1.059834	35.55614	7.263655	1.599306	43.29065	1.207439
3	8.726822	7.125692	0.779907	0.817794	30.25596	9.097354	4.424180	44.29634	3.202778
4	8.987863	5.923944	0.647971	0.861469	25.84509	11.21720	7.480289	42.86036	5.163678
5	9.173893	5.284796	0.585414	1.096680	22.52517	13.47646	10.18560	40.26939	6.576481
6	9.328465	4.980372	0.595123	1.364330	20.32347	15.70501	12.30269	37.44610	7.282899
7	9.471549	4.846708	0.654015	1.556209	19.15277	17.73381	13.76832	34.90794	7.380226
8	9.612978	4.782567	0.732726	1.636994	18.84530	19.41234	14.60837	32.86957	7.112133
9	9.756642	4.730437	0.805928	1.626132	19.17182	20.62738	14.90659	31.35148	6.780239
10	9.902362	4.661226	0.857004	1.570866	19.86459	21.32358	14.79170	30.26224	6.668789

originators' ability to evaluate risk deteriorates over time. This is supported by Guttentag and Herring's (1984: 1359) 'disaster myopia' mind-set that occurs after the credit extension euphoria that occurs after a shock. Cost of funds and debt will have a material impact on the originators willingness to grant credit and business entities' willingness to invest.

Variance decomposition (VD) provides an understanding of how much each of the variables account for the variance over time. To ensure orthogonality of the errors, structural decomposition was applied by restricting the lower diagonal. Based on the results in Table 2, the VD of the coincident indicator demonstrates that the variation of credit that explains the variation in the coincident indicator grows over time. Initially, the coincident indicator only explains 22% of the variance from equilibrium, increasing to 33% after 10 periods. Credit begins by explaining 18% and increases to 30% over time. This corroborates the Granger results which support an endogenous model. Moreover, the two-way causal relationship as well as the cointegration results is congruent with these results. Initially, cost of funds contributes to 37% of the variance in the coincident indicator, but this decreases over 10 periods to

to 10% of the variance that can be explained by cost of funds. Debt and prime explain 5 and 10% of the variance in the coincident indicator over time. The VD of credit displayed in Table 2 indicates that the coincident indicator accounts for 40% of the variance initially, and reducing to 20% over time. The fact that credit only accounts for 5% initially, increasing gradually to 20%, in other words there are other sources that explain the variation in credit other that credit itself. This outcome is supportive of the Granger results. Debt builds up gradually and accounts for 14% of the variation in credit, over time and insolvencies move from 38 to 34%. These results support the theory discussed earlier that debt and insolvencies play a direct role in credit granting rating models (Adrian and Shin, 2009: 5). Additionally, debt tends to evolve over time and these levels of indebtedness remain sticky. Prime represents 5% of the variance. It can be argued that the prime rate is captured indirectly through insolvencies and debt. As the prime rate increases, so do insolvencies and debt.

The variance decomposition results support the outcomes from the impulse response tests as well as the VECM and cointegration tests. The results from the tests undertaken strongly support the hypothesis that a positive relationship of procyclicality exists between credit and coincident indicator.

Results from the SVAR model are substantiated by economic theory and also support the hypothesis that banks have a role to play in the fluctuation of the business cycle amplitude.

CONCLUSION

This study investigated the role that banks play in amplifying the business cycle and what the impact of this is on the macroeconomy. The findings confirm a significant relationship between credit extension and the business cycle. Credit plays a unifying role in the expansion and contraction of the cycle and it is positively correlated to a number of associated variables.

Results from the econometric model strongly support a positive underlying relationship and are supported, in particular, by the two-way relationship that exists between credit and the coincident indicator. The robustness of the results was supported by the Granger tests, cointegration tests, VECM, impulse response and variance decomposition tests. This can be augmented by economic theory that argues in favour of the tendency that credit acts as a reinforcing force that increases broader amplitude fluctuations.

The outcomes of this study support the studies by Bordo and Haubrich (2009: 1), Borio et al. (2001: 1), Akinboade and Makina (2009a: 1), Armistead (2009: 1), Masschelein (2007: 1); Columba et al. (2009: 1), and White (2006: 4). These studies show that banks exacerbate the amplitude of the cycle by increasing access to credit during the upturn and tightening credit during the downturn and at the trough. The recent credit crisis has renewed the focus in this area and as a result, further studies comparing South Africa to global business cycles are likely.

REFERENCES

Adrian T, Shin AS (2009). Liquidity and Leverage, revised January 2009. Federal Reserve Bank of New York, Staff Report No. 328.

Akerlof GA, Shiller RJ (2009). Animal Spirits: How Human Psychology Drives the Economy, and why it Matters for Global Capitalism. Princeton University Press.

Akinboade OA, Makina D (2009a). Econometric analysis of bank lending and business cycles in South Africa. J. Appl. Econ., pp. 1-9

Akinboade OA, Makina D (2009b). Bank Lending and Business Cycles: South African Evidence. Afr. Dev. Rev., 21(3): 476–498.

Armistead T (2009). Bernanke's 'Procyclicality' - What Does It Mean? Seeking Alpha. Available from: http://seekingalpha.com/article/117979-bernanke-s-procyclicality-what-does-it-mean.

Arndt E (1937). Banking and Currency Development in South Africa. 1652-1927, 282p.

Asea PK, Blomberg SB (1997). Lending Cycles. National. Bureau Econ. Res., Working Paper, No. 764.

Basu S, Taylor AM (1999). Business Cycles in International Historical Perspective. National. Bureau of Economic Research, Working Paper, No. 7090.

Berger AN, Udell GF (2003). The Institutional Memory Hypothesis and the Procyclicality of Bank Lending Behaviour. BIS, Working Paper 125.

Bergman UM, Bordo MD, Jonung L (1998). Historical Evidence on Business Cycles: The International Experience. Stockholm School of Economic, Working Paper, No. 255.

Bernanke BS (1983). Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression. Am. Econ. Rev., 1983(73): 257-276.

Bernanke BS, Gertler M (1989). Monetary Policy and Asset Price Volatility. 4th Quarter: Fed. Reserve Bank Kansas City Econ. Rev. 84(4): 17-52. .

Bernanke BS, Lown C (1991).The Credit Crunch. Brooking Papers. Econ. Activity, 1999(2): 205-239.

Bernstein PL (1998). Against the Gods: The Remarkable Story of Risk. Wiley and Sons.

Bordo MD (2006). Sudden Stops, Financial Crises and Original Sin in Emerging Countries: Déjà vu? National Bureau of Economic Research, Working Paper, No. 12393.

Bordo MD, Dueker MJ, Wheelock DC (2008). Inflation, Monetary Policy and Stock Market Conditions. vu? National Bureau of Economic Research, Working Paper, No. 14019.

Bordo MD, Haubrich JG (2009). Credit Crises, Money and Contractions: An Historical View. vu? National Bureau of Economic Research, Working Paper, No. 15389.

Borio C, Furfine C, Lowe P (2001). Procyclicality of the Financial System and Financial Stability: Issues and Policy Options. Bank Int. Sett., Working Paper, No. 1, 1p.

Botha I (2004). Theory and Practice at a South African University. PhD. Johannesburg: University Johannesburg.

Chetty S, Greyling L, Schoeman CH, Van Zyl GS, Wentzel A (2008). A basic approach to fundamental economic theory. APT Print and Paper.

Cloete J (1990). The Business Cycle and the Long Wave: With Special Reference to South Africa. Johannesburg: Inst. of Bankers in South Africa.

Columba F, Cornacchia W, Salleo C (2009). Financial Sector Procyclicality – Lessons from the crisis. VOX Res. Based Pol. Anal., pp. 1-4.

Crouhy M, Galai D, Mark R (2001). Risk Management. New York: McGraw Hill.

Fisher I (1933). The Debt-Deflation Theory of Great Depressions. Econometrica, pp. 337-357.

Friedman M, Schwartz AJ (1963). Great Contraction, 1929-1933. Princeton, N.J.: Princeton University Press.
Gertler M (1988). Financial Structure and Aggregate Economic Activity: An Overview. J. Money, Credit, Banking, pp. 559-588. 20 Aug. 1988.
Gujarati DN, Porter DC (2009). Basic Econometrics. New York: McGraw Hill, pp. 773-799.
Guttentag J, Herring R (1984). Credit Rationing and Financial Disorder. J. Finan. 39: 1359–1382.
Hofmann B (2005). Procyclicality: The Macroeconomic Impact of Risk-Based Capital Requirements. Swiss Soc. Finan. Mark. Res., 1: 179p.
Kaminsky GL, Reinhart CM, Végh CA (2004). When it Rains it Pours: Procyclical Capital Flows and Macroeconomic Policies. NBER Macroeconomic Annual, Cambridge, MA: MIT Press.
Keynes JM (1921). A Treatise on Probability. London: Macmillan, 1921.
Kiyotaki N (1998). Credit and Business Cycles. Jpn. Econ. Rev., 49(1): 18-34.
Le Roux E (2009). Business Confidence Deteriorates Further. Bureau of Economic Research, 1p.
Lown C, Morgan D (2004). The Credit Cycle and the Business Cycle: New Findings Using the Loan Officer Opinion Survey. Stockholm Institute of Financial Research Report, No. 27.
Masschelein N (2007). Monitoring Procyclicality Under the Capital Requirements Directive: Preliminary Concepts for Developing a Framework. Nat. Bank of Belgium. Eurosystem, pp.1-18.
Otto T (2007). Mechanics of Financial Markets. Beaufort Institute, 5p.
Owens RE, Schreft SL (1993). Identifying Credit Crunches. Fed. Reserve Bank Richmond Economic Review, Working Paper, 93-2.
Peek J, Rosengren ES (1995). Is Bank Lending Important for the Transmission of Monetary Policy? Federal Reserve Bank Boston Conf. Ser. No. 39, June, pp. 47 – 68.
Pesaran MH, Schuermann T, Treutler BJ (2005). Global Business Cycles and Credit Risk. National Bureau of Economic Research Working Paper, No.11493.
Power GJ, Vedenov DV (2009). The Price Shock Transmission during the 2007-2008 Commodity Bull Cycle: A Structural Vector Auto-Regression Approach to the "Chicken-or-Egg" Problem. Agricultural & Applied Economics Association's AAEA & ACCI Joint Annual Meeting, Milwaukee, WI, July 26-28, 8p.
Rajan RG (1994). Why Bank Credit Policies Fluctuate: A Theory and Some Evidence. Q. J. Econ., 109(2): 399-441.
Rajan RG (2005). Has Financial Development Made the World Riskier? National Bureau of Economic Research, Working Paper, No. 11728.
Reuters database (2010). Available from: www.reuters.com
Rose AK, Spiegel MM (2009). Cross-Country Causes and Consequences of the 2008 Crises: Early warning. National Bureau of Economic Research, Working Paper. No. 15357,1p.
Scarlata J, Novoa A, Sole J (2009). Fair Value Accounting and Procyclicality. Int. Monet. Fund Staff Paper, 09/39, Chapter 3.
Schularick M, Taylor AM (2009). Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870 – 2008. National. Bureau of Economic Research.
Schumann CGW (1938). Structural Changes and Business Cycles in South Africa 1806-1936. London, P.S. King.
Schwert GW (1989). Business Cycles, Financial Crises and Stock Volatility. National Bureau of Economic Research, Working Paper, 2957.
Sims CA (2002). Structural VAR's. Time Series Econom terics, 153: 1-9.
Smullen J, Hand N (2005). Dictionary of Finance and Banking. Oxford University Press, 98p.
South African Reserve Bank (2010). Institutions for BA 900 for May. www.reservebank.co.za/sarbdata/ifdata/inst.asp?type=BA900&period=2010-05-31, pp. 1.
Statistics South Africa (2009). Quarterly labour force survey. Quart. 4, 2010, Statist. Release P0210, 4p.
Statistics South Africa (2010). Quarterly labour force survey. Quart. 1, 2010, Statist. Release P0211, 7p.
Stock JH, Watson MW (1998). Business Cycle Fluctuations in U.S. Macroeconomic Time Series. National. Bureau of Economic. Research, Working Paper, No. 6528.
Stock JH, Watson MW (2003). Understanding Changes in International Business Cycle Dynamics. National Bureau of Economic Research pp. 11-13.
Tversky A (1990). The Psychology of Risk. In Sharpe, pp. 25-77.
Van Zyl C, Botha Z, Skerrit P (2003). South African Financial Markets. Pretoria: Van Schaik.
Venter JC, Pretorius WS (2009). Business Cycles in South Africa During the period 1999 – 2007. Article: Q. Bull: South Afr. Res. Bank.
White WR (2006). Procyclicality in the Financial System: Do We Need a New Macrofinancial Stabilization Framework? Bank Int. Sett., 93, pp. 1-19.